

### Abstract

The invention is a novel sputter target and deposition method for multi-element thin film phosphors for thick film dielectric electroluminescent displays in which the deposited phosphors provide a high luminance and colors required for TV applications. The method comprises sputtering a single composite target in a low pressure sputtering atmosphere that comprises gases containing reactive species and non-reactive species. The composite target comprising a matrix phase and an inclusion phase, or two matrix phases, wherein one of the phases comprises one or more metallic elements that contribute to the composition of the phosphor and the other of the phases comprises the remaining elements that contribute to the composition of the phosphor. In the method the pressure of the reactive species within the sputtering atmosphere is varied to control the sputtering rate of the matrix and inclusion phases of the composite target to cause the ratio of the elements in the two phases to deposit in a desired ratio as a phosphor film on the substrate.